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HEALTHY HOUSING IN THE NORTH TOWARDS A NORTHERN HEALTHY HOUSE DEMONSTRATION PROJECT

Introduction

This study is a review of the principles and technical information that can influence the realization of healthy and more sustainable housing in the North through a typical building life cycle. The objective of this study is to begin to address and enhance the ecological sustainability, social appropriateness, and full cost economic aspects of northern housing.

The approach is based on developing a northern vision of the CMHC Healthy House™ concept, which includes five principles: Occupant Health, Energy Efficiency, Resource Efficiency, Environmental Responsibility and Affordability. This document is intended to be a guide for the conceptual design, development and promotion of a Northern Healthy House.

The study is intended for the use of decision-makers who can advance this goal, including policy makers, regulators, administrators, planners, designers, builders, buyers and educators.

The study is divided into two parts.

Part One: Conditions and Concepts

This section includes an overview of the northern context, ecological sustainability, social appropriateness, and economic aspects of northern housing including:

Section One: Land and People

The Environmental Imperative

- Generic discussion of sustainability

The Physical Environment

- Unique physical, biological and climatic constraints of the northern environment
- Unique design considerations of northern housing
- Natural resource profile of the North

The Planning Environment

- Special planning needs of northern people and communities
- Ecological planning strategies for the North



Section Two: Economics and Policy

Economics: Ecological Sustainability, Socio-economics and Full Cost Accounting

- Impact of transportation, climate, resources and alternatives on northern housing
- Application of sustainable building assessment tools of Life Cycle Analysis (LCA), embodied energy and Full Cost Accounting (FCA) to four general areas of practice: transportation, building materials, fuel, and operations and maintenance
- Implications of climate change adaptation for site selection of northern housing

Regulations and Policy

- Need for flexibility in planning standards and regulations to permit options in financing and tenure and use of innovative servicing systems.
- Recommendations for policy changes, which could enable sustainable building with respect to water, power, heating area development, site development and remote buildings.

Part Two: Technology and Information

Part two is a review of technical options and information sources including:

Section Three: Materials and Technology

- A discussion of resource-efficient and healthy housing technology options

Section Four: Information Resources

- A list of appropriate planning, design and material resources for northern healthy housing

Methodology

The authors undertook a literature search and review of the principles and technical information that can influence the realization of healthy and more sustainable housing in the North. The review focused on issues, which could begin to address and enhance the ecological sustainability, social appropriateness, and full cost economic aspects of northern housing.

Results

Key problems and solutions within the context of typical northern climatic, geological and ecological zones are listed. The issues are discussed in relation to the specific needs of geographically and ethnically diverse populations as well as specific biological and physical resource bases.

Key issues discussed include:

- Physiographic, climatic and environmental factors
- Linkage of housing and culture and the of impact of adopting Southern norms and growing expectations
- Changes from traditional lifestyles (urban versus remote and sparse populations)
- Participatory planning which is user-driven
- Housing and localized economy—potential for use of local resources
- Need for distributed, autonomous and appropriate scale infrastructure
- Ecologically sustainable building and full cost accounting
- Siting, energy conservation, air quality and building system design
- Need for low-maintenance technologies, affordability and local self-reliance
- Integrated approaches to materials and technology
- Need for site-specific participatory planning and regulatory flexibility
- Need to address climate change including permafrost changes
- Alternative energy options (solar, wind, water, etc.)
- Transportation impacts of material choices
- Operating versus embodied energy impacts compared with Southern housing
- Impact of declining subsidies and increasing urbanization
- Tenure options in light of affordability.

Recommendations

The need to explore alternative housing strategies is emphasized. This entails living within the limits of our environment. There is a need to raise awareness of alternatives, and the externalized costs to others of gross overuse of resources. One tool is the conservation and use of Life Cycle Analysis (LCA) of costs, the recognition of embodied energy and use of Full Cost Accounting (FCA) in material selection. This can be achieved through participatory planning which is user-driven, and the development of local resources and materials, and use of local labour and energy supplies. Integrated approaches are needed to be combined with flexibility in financing, regulations, policy and standards to make this occur.

Conclusions

The authors conclude that current trends in northern housing are not sustainable and that while sustainable objectives are harder to meet under the harsh constraints of the northern climate, culture, economy and resource base, there are still significant opportunities. A multi-ethnic and linguistic society undergoing rapid urbanization with a high youth population and rental percentage, and a short cultural history of permanent housing, places unique challenges on northern societies, which are not typically satisfied through the importation of southern norms and technologies.

There is a need to adapt new technologies and to prove their application, reliability and cost-effectiveness under the unique demands and constraints of northern climates, infrastructures and cultures. The authors point out that it is important not to overwhelm local users with new technical and financial dependencies, and to avoid projects which are out of scale to local control or resources and to avoid continued subsidization of unsustainable systems. Alternative planning, permitting, design, construction and financing mechanisms are required to facilitate and encourage appropriate action in the North.

The authors call for improved sustainability training for northern authorities and community leaders to encourage the use of local and more appropriate materials and methods, and to encourage the application of local decision-making. They conclude that the need to exercise caution in the development of heavy infrastructure and in the use of chemicals and toxins is more important in the fragile context of the North. This needs to be supported by regulations which permit self-produced power, alternative waste systems, autonomous buildings and distributed infrastructure options to be implemented.

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Housing Research at CMHC

Under Part IX of the *National Housing Act*, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

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